

1     ABSTRACT OF THE DISCLOSURE

          An optical semiconductor device includes an  
SiC substrate having an n-type conductivity, and an  
AlGaN buffer layer having an n-type conductivity  
5     formed on the SiC substrate with a composition  
represented as  $\text{Al}_x\text{Ga}_{1-x}\text{N}$ , wherein the AlGaN buffer  
layer has a carrier density in the range between  $3 \times$   
 $10^{18}$  -  $1 \times 10^{20} \text{cm}^{-3}$ , and the compositional parameter  $x$   
is larger than 0 but smaller than 0.4 ( $0 < x < 0.4$ ).

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